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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,189	03/28/2002	Kevin George Harding	RD-29310	4768
41838	7590	02/04/2005	EXAMINER	
GENERAL ELECTRIC COMPANY (PCPI)			STREGE, JOHN B	
C/O FLETCHER YODER			ART UNIT	
P. O. BOX 692289			PAPER NUMBER	
HOUSTON, TX 77269-2289			2625	

DATE MAILED: 02/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/063,189

Applicant(s)

HARDING, KEVIN GEORGE

Examiner

John B Strege

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,3-7,13,15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. USPN 4,297,034 (hereinafter "Ito") in view of Beaty et al. USPN 6,072,898 (hereinafter "Beaty").

Ito discloses a method for measuring contour configuration of articles (col. 1 lines 5-10). As seen in figure 1 Beaty recites a light source such as a lamp 8 for illuminating an article to be measured 1 (col. 2 lines 17-19). The article is placed on a turn table connected to a rotating shaft to rotate the article (col. 2 lines 8-14). The part is viewed with a pick up device which may be a television camera (col. 2 lines 39). The video signal is sent to an operation circuit that processes the image of the contour of the part and produces a signal which represents whether or not the measured article has a correct contour configuration (col. 3 lines 24-37). The edge of the image must be located here and the part is three dimensional.

Although all of the following limitations could be argued to be inherent with Beaty, he does not explicitly disclose that the light source is a diffuse light source, nor that the light reflected from the part creates an outline of the part along the edge thereof, nor that the image is processed to locate the edge of the part in three dimensional space.

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Most light sources used for commercial purposes are diffuse light sources, if a part has an edge then light will be reflected off that edge when the part is rotated, and the edge of the part must be located to measure the contour configuration from the video signal of the article.

Beaty discloses a method and apparatus for three dimensional inspection of electronic components (col. 1 lines 15-20). Beaty discloses that a light source and overhead diffuser provide illumination that enhances the outline of the part (col. 2 lines 23-25). This provides for the diffuse light source limitation and the light reflection creating an outline limitation. Beaty further discloses (in figure 5A) that the processor employs a subpixel edge detection method in step 157 (col. 10 lines 26-27). Following this world values (3D values) of the part are found using triangulation techniques (col. 10 lines 29-46 and last sentence of the abstract).

Ito and Beaty are analogous art because they are from the same field of endeavor of inspection using image processing.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Ito and Beaty to obtain a system using a diffuse light source to enhance the contour of the part and to locate the edge in three dimensions to be able to measure the contours precisely. Thus it would have been obvious to one of ordinary skill in the art to combine Ito and Beaty to obtain the invention of claim 1.

Regarding claim 3, as discussed Ito discloses a television camera.

Regarding claims 4-5, it is well known in the art of edge detection to count the number of pixels, thus the examiner declares official notice. It would be obvious to count

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the number of pixels to determine the edge since this is the process that is normally done.

Regarding claim 6, the ball grid array has multiple balls, and edge detection is used for each of the balls (figures 3B1-3B3).

Regarding claim 7, as discussed Beaty discloses finding dimensions of the BGA.

Claim 13 is similar to claim 1, thus the same arguments applied for claim 1 apply equally to claim 13.

Regarding claim 15, it is well known in the art of edge detection to count the number of pixels, thus the examiner declares official notice. It would be obvious to count the number of pixels to determine the edge since this is the process that is normally done.

Regarding claim 16, the ball grid array has multiple balls, and edge detection is used for each of the balls (figures 3B1-3B3).

Regarding claim 17, as discussed Beaty discloses finding dimensions of the BGA.

Claim 18 is similar to claim 1, thus the same arguments applied to claim 1 apply equally to claim 18. Furthermore Beaty discloses that prior art systems use structured light and suggests improvements (col. 1 lines 23-25). Thus it would be obvious to improve a structured light system.

Regarding claim 19, the ball grid array has multiple balls, and edge detection is used for each of the balls (figures 3B1-3B3).

3. Claims 2,8-12,14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. USPN 4,297,034 (hereinafter "Ito") in view of Beaty et al. USPN 6,072,898 (hereinafter "Beaty"), and further in view of Sugiura et al. USPN 6,034,766 (hereinafter "Sugiura").

Claim 2 is dependent on claim 1 rejected above (Beaty and Ito). Beaty discloses using a lamp, but does not explicitly state that the lamp uses a white light source. It is well known to use a white light source with a lamp for inspection purposes. Sugiura discloses an optical inspection system that uses white light to illuminate the object (col. 10 lines 29-31).

Ito, Beaty, and Sugiura are all analogous art because they are all from the same field of endeavor of inspection using image processing.

It would have been obvious to one of ordinary skill in the art to use a white light source for the lamp disclosed by Ito since it is conventionally used in inspection system and gives off light of all the visible wavelengths. Thus it would have been obvious to one of ordinary skill in the art to combine Ito, Beaty, and Sugiura to obtain the invention of claim 2.

Claim 8 has the same limitations as claim 2, thus the same arguments for claim 2 apply equally to claim 8.

Regarding claim 9, Beaty discloses that prior art inspection systems used structured light patterns (col. 1 lines 23-25).

Regarding claim 10, it is well known in the art of edge detection to count the number of pixels, thus the examiner declares official notice. It would be obvious to count

the number of pixels to determine the edge since this is the process that is normally done.

Regarding claim 11, the ball grid array has multiple balls, and edge detection is used for each of the balls (figures 3B1-3B3).

Regarding claim 12, as discussed Beaty discloses finding dimensions of the BGA.

Claim 14 is similar to claim 2, thus the same arguments applied for claim 2 apply equally to claim 14.

Claim 20 is similar to claim 8, thus the same arguments applied for claim 8 apply equally to claim 14.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 5,570,186 Method for inspecting the curvature of a profile, such as an edge of a turbine blade.


USPN 4,995,087 Machine vision system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Strege whose telephone number is (703) 305-8679. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JS



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